UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,441	03/01/2002	Bernhard O. Palsson	UCSD1330-2	6649

28213 7590 05/12/2006

DLA PIPER RUDNICK GRAY CARY US, LLP
4365 EXECUTIVE DRIVE
SUITE 1100
SAN DIEGO, CA 92121-2133

EXAMINER	
ZEMAN, MARY K	

ART UNIT	PAPER NUMBER
1631	

DATE MAILED: 05/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/087,441	PALSSON ET AL.	
	Examiner	Art Unit	
	Mary K. Zeman	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-74* is/are pending in the application.

4a) Of the above claim(s) *66-69* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-65 and 70-74* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-74* are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 12/29/05 has been entered.

Claims 1-74 are pending in this application. Claims 1-65 and 70-74 are under examination. Claims 66-69 stand withdrawn from consideration. Claims 71, 72 and 74 were previously indicated to be allowable. This indication of allowability has been withdrawn in view of the rejection under 101 set forth below.

Specification

The specification remains objected to under 37 CFR 1.75(d)(1) for failing to provide proper antecedent basis for the subject matter of claims 12-13 and 46-47. The paragraphs cited by applicant do not disclose the concept of a data structure relating a plurality of reactions of a biochemical reaction network for reactions that occur in a first cell in a population with a regulatory data structure that represents events that occur in a second cell in a population as required by the claims.

Paragraph [0033] discusses an in silico model or data structure "the term is intended to mean a first reaction that is related to a second reaction by a function that alters the flux through the second reaction by changing the value of a constraint on the second reaction." This does not refer to the reactions taking place in different cells of a population. Paragraph [0038] states that the data structure "serves as a representation of a biological reaction network or system.] This does not refer to the reactions taking place in different cells of one or more populations. *In fact, this paragraph makes clear it is within or about one cell:* cytosol versus extracellular; different compartments of the same cell; different organelles of the same cell. Paragraph [0135] lists exemplaray organisms which can be modeled. This is not support for the concept of a data structure relating a plurality of reactions of a biochemical reaction network for reactions that occur in a first cell in a population with a regulatory data structure that represents events that

occur in a second cell in a population as required by the claims. Paragraph [0136] discusses the incorporation of a regulatory structure but does not provide support for the data structures.

The amendment filed 12/29/05 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: in claim 30 the limitation which now reads "confidence rating for occurrence of a reaction." Applicant points to paragraph [0040] for basis. This section does not set forth that the confidence rating is for the actual occurrence of a reaction. This portion reads that "Other annotation information can include, for example, the names of the enzymes catalyzing a particular reaction, the genes that code for the enzymes, the EC number of the particular metabolic reaction, a subset of reactions to which the reaction belongs, citations to references from which information was obtained, or *a level of confidence with which a reaction is believed to occur in a particular biochemical reaction network or organism.*" These are not synonymous. In claims 35-38 the limitations of "condition-dependent value" and "variable constraint comprises a value conditioned on the outcome of ..." are new matter. Applicant points to paragraph [0033]. This paragraph does not talk about condition dependent values, or values that are "conditioned" on any other limitation. Applicant points to paragraph [0047]. This paragraph does not talk about condition dependent values, or values that are "conditioned" on any other limitation. It discusses "regulatory events.". Applicant points to paragraph [0049]. This paragraph does not talk about condition dependent values, or values that are "conditioned" on any other limitation. It discusses variable functions.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-65 and 70-74 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. This rejection is maintained for claims 1-20 and 23-33, and newly added for claims 34-65 and 70-74.

Claims 1-20 and 23-33 are drawn to computer readable media comprising a listing of data and a listing of constraint sets for the data. The specification does not provide a limiting definition for computer readable media, and therefor can encompass forms of data storage such as carrier waves, which are non-statutory. Further, the media merely comprises non-functional descriptive data, which does not render the computer readable media statutory. Applicant has provided arguments that the structure and constraint sets interact with the media. This is not the case as the structure is merely a listing of data (a list of reactants related to a description of a chemical or enzymatic reaction), and the constraint sets are "variable constraints" which regulate how the lists are related. None of the information causes the computer media to perform any computer-implemented task or procedure. Applicant is again pointed to the discussion of non-functional descriptive data in the Official Gazette. 1300 OG 142, 11/22/2005 and MPEP 2106.

Claims 34-65 and 70 are rejected as being non-statutory as the methods do not produce a concrete, tangible and useful result. The methods do not transform a physical object to a different state. The result of the method is a "systemic property of said biochemical reaction network" which is not a concrete tangible and useful result. The result is not communicated to a user and is not tangible. The result is not concrete, as it is not predictable. The result is not useful as it is not specific, or substantial- it is not clear what the result is, or why it would be useful to one of skill in the art.

Claims 71-74 are also non-statutory as the methods do not produce a concrete, tangible and useful result. The methods do not transform a physical object to a different state. The result of the iterated, modified method is a "systemic property of said biochemical reaction network" which is not a concrete tangible and useful result. The result is not communicated to a user and is not tangible. The result is not concrete, as it is not predictable. The result is not useful as it is not specific, or substantial- it is not clear what the result is, or why it would be useful to one of skill in the art.

For claims including such excluded subject matter to be eligible, the claim must be for a practical application of the abstract idea, law of nature, or natural phenomenon. Diehr, 450 U.S.

at 187, 209 USPQ at 8 ("application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."); Benson, 409 U.S. at 71, 175 USPQ at 676 (rejecting formula claim because it "has no substantial practical application").

To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways:

1) The claimed invention "transforms" an article or physical object to a different state or thing.

2) The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

Practical Application That Produces a Useful, Concrete, and Tangible Result

For eligibility analysis, physical transformation "is not an invariable requirement, but merely one example of how a mathematical algorithm [or law of nature] may bring about a useful application." AT&T, 172 F.3d at 1358-59, 50 USPQ2d at 1452... In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete." (1) "USEFUL RESULT" For an invention to be "useful" it must satisfy the utility requirement of section 101. The USPTO's official interpretation of the utility requirement provides that the utility of an invention has to be (i) specific, (ii) substantial and (iii) credible. MPEP § 2107 and Fisher, 421 F.3d at ___, 76 USPQ2d at 1230 (citing the Utility Guidelines with approval for interpretation of "specific" and "substantial"). (2) "TANGIBLE RESULT" The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a § 101 judicial exception, in that the process claim must set forth a practical application of that § 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application."). "[A]n application of a law of nature or mathematical formula to a ... process may well be deserving of patent protection." Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis added); see also Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 ("It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . ."). In other words, the opposite meaning of "tangible" is "abstract." (3) "CONCRETE RESULT" Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. In other words, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. In re Swartz, 232 F.3d 862, 864, 56 USPQ2d 1703, 1704 (Fed. Cir. 2000) (where asserted result produced by the claimed invention is "irreproducible" claim should be rejected under section 101). The opposite of "concrete" is unrepeatable or unpredictable.

See also: 1300 OG 142, 11/22/2005.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 12-13, 30, 35-38 and 46-47 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification fails to provide proper basis for the subject matter of claims 12-13 and 46-47. The paragraphs cited by applicant do not disclose the concept of a data structure relating a plurality of reactions of a biochemical reaction network for reactions that occur in a first cell in a population with a regulatory data structure that represents events that occur in a second cell in a population as required by the claims.

As set forth above, Paragraph [0033] discusses an in silico model or data structure "the term is intended to mean a first reaction that is related to a second reaction by a function that alters the flux through the second reaction by changing the value of a constraint on the second reaction." This does not refer to the reactions taking place in different cells of a population. Paragraph [0038] states that the data structure "serves as a representation of a biological reaction network or system.] This does not refer to the reactions taking place in different cells of one or more populations. *In fact, this paragraph makes clear it is within or about one cell:* cytosol versus extracellular; different compartments of the same cell; different organelles of the same cell. Paragraph [0135] lists exemplary organisms which can be modeled. This is not support for the concept of a data structure relating a plurality of reactions of a biochemical reaction network for reactions that occur in a first cell in a population with a regulatory data structure that represents events that occur in a second cell in a population as required by the claims. Paragraph [0136] discusses the incorporation of a regulatory structure but does not provide support for the data structures.

In regards to claim 30 the limitation which now reads "confidence rating for occurrence of a reaction" is new matter. Applicant points to paragraph [0040] for basis. This section does not set forth that the confidence rating is for the actual occurrence of a reaction. This portion reads that "Other annotation information can include, for example, the names of the enzymes catalyzing a particular reaction, the genes that code for the enzymes, the EC number of the particular metabolic reaction, a subset of reactions to which the reaction belongs, citations to references from which information was obtained, or *a level of confidence with which a reaction is believed to occur in a particular biochemical reaction network or organism.*" These are not synonymous. In claims 35-38 the limitations of "condition-dependent value" and "variable constraint comprises a value conditioned on the outcome of ..." are new matter. Applicant points to paragraph [0033]. This paragraph does not talk about condition dependent values, or values that are "conditioned" on any other limitation. Applicant points to paragraph [0047]. This paragraph does not talk about condition dependent values, or values that are "conditioned" on any other limitation. It discusses "regulatory events.". Applicant points to paragraph [0049]. This paragraph does not talk about condition dependent values, or values that are "conditioned" on any other limitation. It discusses variable functions.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-7, 9-16, 26-30, 32-33, 35-39, 48-50, 52, 55, 64-66 and 73 remain rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention for the reasons of record.

Applicants arguments fail to render the claims definite. Applicant is arguing on the one hand that the claims have a physical structure and are a composition of matter for statutory considerations, but refuses to illustrate how the multiple dependent claims further limit that composition of matter or structure. A computer readable media stores data which is binary or bits of data. These bits are not distinguishable from any other bits of data . The claim limitations all modify the arrangement of non-functional descriptive material stored on the

computer readable media. These limitations do NOT alter the structure of the composition being claimed (the media). Merely rearranging data information on a computer readable media is not further limiting.

Applicant has failed to distinguish a computer readable media comprising a list of reactants and a constraint set of claim 1 from a computer readable media as defined in claim 2, or claim 10, or any other claim.

Claim 14 remains rejected as Applicant refuses to identify the metes and bounds of the claim. Claim 14 discloses a "constraint function" but will not identify whether this is a method step or an algorithm or a variable. Applicant points to many places in the specification without ascribing a particular definition. While the claims are read in light of the specification, limitations from the specification are not read into the claims.

Applicant's amendments to claims 30 and 35-38 do not obviate the rejections made under 35 USC 112, second paragraph, as it is entirely unclear how a value is "conditioned on the outcome". The sections to which Applicant points for basis are not sufficient and do not provide the metes and bounds of the claimed invention.

Applicant's arguments with respect to claims 48-50, 52, 55, 64-66 and 73 are not persuasive, as limitations from the specification are not read into the claims. Applicant is arguing that one of skill in the art would understand what is meant, without actually identifying what is meant.

Priority

The examiner has reviewed the arguments of record. The examiner maintains the denial of priority to the provisional applications. 60/272254 discloses no computer readable media comprising lists of reactants, lists of reactions and constraint sets as set forth in claims 1-33. This provisional does not disclose the methods of claims 34-65 or 70-74. Applicant is encouraged to point out basis by page and line number in this provisional.

60/323028 does not disclose a computer readable media comprising lists of reactants, lists of reactions and constraint sets as required by claims 1-33. This provisional does not disclose the claimed methods of claims 34-65 and 70-74. Applicant is encouraged to point out basis by page and line number.

Claim Rejections - 35 USC 102

Claims 1-3, 5-7, 17-20, 23-26, 29, 32-34, 40, 53-54, 56-61, and 64-66 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 00/46405 (10 August 2000).

This rejection is maintained for reasons of record.

Applicant argues that this reference does not disclose each and every limitation of the rejected claims. This is not persuasive. This reference teaches computer readable media comprising data describing biological networks. The data itself is non-functional descriptive material. Even so, this reference discloses a metabolic genotype for an organism including stoichiometric matrix (the data structure) that can be analyzed using flux balance analysis to assess effects under different conditions. The assignment of function to an open reading frame is disclosed. (annotation). Regulated reactions and variable constraints within the meaning of the claims are disclosed by the prior art. At least page 3, lines 15-36, and page 7, lines 19-27, disclose limiting constraints on various fluxes (meaning the constraints are variable and the reactions they are related to are regulated). The constraint set is considered to be the constraints on various fluxes and environmental inputs to the network. Linear programming can be used. The invention is embodied in a software application. The systemic property of a biochemical reaction network determined by the prior art is at least one flux distribution that minimizes or maximizes said objective function when the constraints are applied to the data structure (see at least page 7, line 20, through page 8, line 33) as required by the method of instant claim 34.

Claim Rejections - 35 USC 103

Claims 1-33 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Edwards et al. (Journal of Biological Chemistry, June 1999).

This rejection is maintained for reasons of record.

Applicant's arguments remain unpersuasive. This document discloses a computer readable media. Edwards et al. teach computer readable media comprising biological data. The only structure required are lists of data and lists of constraints. This document provides computer readable media which stores lists of biological data.

The difference between the prior art and the claimed invention is the recited reactants, variables or constraints. This information is descriptive information stored on or employed by a machine. The claims merely store the information, and do not act upon it. The media does not perform any steps. It merely stores the lists of data. Neither the specification, nor the claims set forth any special, non-obvious modifications to the known, conventional computer readable media. Nonfunctional descriptive material cannot render non-obvious an invention that would have otherwise been obvious. See In re Gulack, 703 F.2d 1381, 1385 (Fed. Cir. 1983) and MPEP 2106. Applicant's arguments with respect to Edwards et al. not teaching a method of determining a systemic property of a biochemical reaction network are not germane as no method claims have been rejected. The structural elements required by the claims are taught by Edwards et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary K Zeman whose telephone number is (571) 272 0723

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272 0811. The fax phone number for the organization where this application or proceeding is assigned is 571 273 8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

MARY K. ZEMAN
PRIMARY EXAMINER
AU1631
5/10/06